

Claims

1. A needleless syringe (10) for injecting active principle and comprising, from upstream to downstream, a propelling system consisting of a shock wave generator device, a barrier comprising an upstream face (5) and a downstream face (6), said downstream face (6) having at least one blind cavity (7) in which the active principle is accommodated, and an application guide (8) for applying said syringe (10) to the skin of the patient to be treated, characterized in that, on the one hand, the barrier (4) is fixed and resistant to the shock wave and, on the other hand, said barrier (4) ensures a good propagation of the shock wave.

2. The needleless syringe as claimed in claim 1, characterized in that the barrier (4) has a substantially plane and transverse upstream face (5).

3. The needleless syringe as claimed in either of claims 1 and 2, characterized in that the shock wave generator device (3) produces a plane shock wave on the upstream face (5) of the fixed barrier (4).

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4. The needleless syringe as claimed in claim 1, characterized in that each blind cavity (7) has an opening transverse section which is at least equal to each transverse section of this cavity (7).
- obj. to drawings only show one.*
what does this mean?

- Sub
a2
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5. The needleless syringe as claimed in either of claims 1 and 4, characterized in that each cavity (7) has a form of revolution about an axis parallel to the direction of propagation of the shock wave.
- obj. to drawings.*

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6. The needleless syringe as claimed in either of claims 1 and 4, characterized in that a plurality of cavities are distributed on the downstream face (6) of said barrier (4).
- obj. today not shown*
How can this be?

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7. The needleless syringe as claimed in one of claims 1 to 3, characterized in that the shock wave on the upstream face (5) of the fixed barrier (4) is produced by a weight which impacts said barrier (4).

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8. The needleless syringe as claimed in one of claims 1 to 3, characterized in that the device (3) generating a shock wave on the upstream face (5) of the fixed barrier (4) comprises a detonating

pyrotechnic charge.

9. The needleless syringe as claimed in one of the preceding claims, characterized in that the length of the application guide (8) is between 1 and 8 times the diameter of the fixed barrier (4) and preferably between 2 and 5 times said diameter. 103 by design.

10. The needleless syringe as claimed in claim 9, characterized in that the application guide (8) comprises a shock absorbing system (2). 103
- design

Concerning point V

Reasoned statement according to Article 35(2) with regard to novelty, inventive activity and industrial applicability; citations and explanations supporting this statement

Reference is made to the following document:

D1: WO 96 25190 A (OXFORD BIOSCIENCES LTD; BELLHOUSE BRIAN JOHN (GB); BELL JOHN (GB)) 22 August 1996 (22.8.1996)

1. The subject of independent claim 1 satisfies the requirements regarding novelty and inventive activity, Article 33(2) and (3) PCT.

Document D1, which is considered the closest prior art, describes a needleless syringe for injection of active principle, comprising, from upstream to downstream, a propelling system consisting of a shock wave generator device, a barrier comprising a downstream face having at least one blind cavity in which the active principle is accommodated, and an application guide for said syringe, from which the syringe forming the subject of claim 1 differs in that said barrier is fixed and resistant to the shock wave and said barrier ensures a good propagation of the shock wave.

The problem which the present invention sets out to solve can be considered as being that of forming more streamlined jets of solid active principle which have a high perforation capacity.

The problem is solved by said barrier which is fixed and resistant to the shock wave and is able to ensure a good transmission of the shock wave. The principle of focusing of the syringe is inspired by the "hollow charge" effect by which the shock wave produced on the upstream face of said fixed and resistant barrier propagates through the barrier and reaches the downstream face of the barrier. When the shock wave has reached the particles of active principle accommodated in the blind cavity situated in the downstream face of the barrier, these particles organize to form a convergent protuberance which changes into a streamlined jet when the shock wave has reached the downstream face of the barrier.

No document in the prior art discloses or renders evident the needleless syringe based on the "hollow charge" effect which includes a fixed and resistant barrier ensuring a good propagation of the shock wave in order to focus the jet of active principle.

2. Claims 2-10 are dependent on claim 1 and introduce additional characteristics of the needleless syringe defined by claim 1.

For this reason, claims 2-10 also satisfy the requirements under Article 33(2) and (3) PCT concerning novelty and inventive activity.

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